REMARKS

Claims 1, 3-5, 7, 8 and new claims 9-18 are now in this application. Claims 2 and 6 are cancelled herein. Claims 1-8 are rejected and claims 5-8 are objected to. Claims 1, 3-5, 7 and 8 are amended herein to clarify the invention, to broaden language as deemed appropriate and to address matters of form unrelated to substantive patentability issues. Some formal matters are attended to that were not addressed by the Examiner and accordingly are considered unrelated to substantive patentability issues.

A substitute Abstract is also presented in better compliance with U.S. practice.

For the convenience of the Examiner, APPENDIX I is provided herewith having a complete set of pending claims with all amendments effected therein.

Claim Objections

The spelling error in claims 5-8 has been removed to overcome the objection to these claims.

Claim Rejections-35 U.S.C. §112

Claims 1 and 5 are amended to remove the phrase "that a cutting piece remains on the cutting blade" and as such, it is respectfully submitted that the Examiner's rejection of claims 1, 3, 5 and 7 under 35 U.S.C. §112, second paragraph, has been overcome and should be removed.

Claim Rejections-35 U.S.C. §102

Claims 1-3 and 5-7 are rejected under 35 U.S.C. §102(b) as being anticipated by the Nishiyama et al. reference (U.S. Pat. No. 4,934,185). Since claims 2 and 6 are cancelled, the rejection of these claims has been rendered moot.

The Examiner's rejection of claims 1, 3, 5 and 7 is respectfully traversed in view of amended claims 1 and 5.

Claim 1 is amended to specify that the cutting blade is moved substantially in parallel with an interface between the upper layer and a lower layer of the structure "while automatically controlling a depth of the cutting blade to a depth slightly higher than the interface" between the upper and lower layer of the structure.

Claim 5 is amended to specify that the apparatus includes control means for automatically controlling a depth of the cutting blade to a depth slightly higher than the interface.

In these embodiments of the invention, the cutting depth of the cutting blade is controlled automatically to be a predetermined depth relative to the interface between the upper and lower layers of the structure, i.e., slightly higher than the interface. This automatic control of the cutting depth of the cutting blade is obtained in one embodiment by means of a cutting depth controller 30m which controls actuation of a motor 11 which in turn controls a longitudinal ball screw 10 to move a longitudinal slide way 4 on which the cutting blade 7 is mounted in a direction

vertical to the interface, i.e., perpendicular to the plane of the interface which corresponds to the depth of the structure-in the direction of arrow d1 (see Fig. 1). This automatic control may be enabled by the generation of automatic transverse load tracing action from the input unit which is converted into a desired control of the depth of the cutting blade by the depth controller 30m (see the specification at page 15, lines 11-15).

Nishiyama et al. does not disclose a breaking strength estimation method and apparatus wherein the depth of a cutting blade is automatically controlled during movement of the cutting blade.

Nishiyama et al. describes a device for measuring the shear strength of a coated film in which a cutting blade 15 is moved by a motor 11 only in a direction parallel to a measuring surface of the coated film. Motor 11 does not move the cutting blade in a direction perpendicular or vertical to the coated film. Rather, to provide for movement of the cutting blade 15 in a vertical direction relative to the coated film (in a vertical direction into the coated film), a support member 7 for the cutting blade 15 is connected to one end of a guide shaft 14 and the opposite end of the guide shaft 14 is connected to a screw-threaded rod 17 into which an adjusting screw 16 is screwed (see col. 6, lines 52-58).

Rotation of the adjusting screw 16 changes the vertical pressure being applied to the coated film and thus the depth of the cutting blade in the coated film. In view of the use of the adjusting screw 16 to change the vertical pressure, it is clear that the

vertical pressure must be manually adjusted in order to vary the cutting depth of the cutting blade.

Accordingly, in contrast to the claimed embodiments of the invention, there is no structure in the Nishiyama et al. device which is operative to move the cutting blade in parallel to the interface while automatically controlling the depth of the cutting blade to a specific depth (as set forth in claim 1) or structure which constitutes control means for automatically controlling a depth of the cutting blade to a specific depth (as set forth in claim 5).

An advantage of the automatic control of the depth of the cutting blade in the invention is that the ability of the device to maintain the cutting depth constant is greatly enhanced because deviations in the cutting depth (for example, deviations from the depth slightly higher than the interface) which might arise during operation can be detected and automatically compensated for. By contrast, since the depth of the cutting blade in the Nishiyama et al. device is only manually adjustable via the adjusting screw 16, such manual adjustment of the depth of the cutting blade severely limits the ability of the cutting blade to instantaneously adjust to deviations in the cutting depth. If a deviation in the cutting depth is detected, the cutting operation would have to be stopped in order to rotate the adjusting screw to reposition the cutting blade at the desired depth.

Since the Nishiyama et al. device does not include all of the features set forth in claims 1 and 5, it cannot anticipate the embodiments of the invention set forth in these claims or in claims 3 and 7 which depend therefrom.

Moreover, with respect to claims 3 and 7, these claims recite that a force exerted on the cutting blade substantially vertical to the interface is expressed in the form of a graphic profile of change with time (see Fv in Fig. 6). In Nishiyama et al., the force exerted on the cutting blade vertical to the interface is constant, e.g., 1.7 kg as shown in Figs. 11a-11d, and is not expressed in the form of a graphic profile of change with time.

In view of the changes to the claims and the arguments presented above, it is respectfully submitted that the Examiner's rejection of claims 1, 3, 5 and 7 under 35 U.S.C. §102(b) as being anticipated by Nishiyama et al. has been overcome and should be removed.

Claim Rejections-35 U.S.C. §103

Claims 4 and 8 are rejected under 35 U.S.C. §103(a) as being unpatentable over the Nishiyama et al. reference.

Claims 4 and 8 are amended to clarify that the depth of the cutting blade is automatically controlled to increase or decrease by a unit of displacement not greater than 2 micrometer. Since the Nishiyama et al. references does not disclose automatic control of the depth of the cutting blade, it cannot teach or suggest automatically

controlling the depth of the cutting blade to increase or decrease in the specified displacement unit.

In view of the foregoing, it is respectfully submitted that the Examiner's rejection of claims 4 and 8 under 35 U.S.C. §103(a) as being unpatentable over the Nishiyama et al. reference has been overcome and should be removed.

New Claims

Claims 9-18 are added and are directed to additional features of the method and apparatus for layered structure breaking strength estimation described in the specification. No fee is due for the presentation of these claims.

Claims 9 and 14 are directed to the feature of the cutting blade being moved while automatically controlling the depth of the cutting blade to be constant (see the description of the Fourth Procedure at page 22, lines 1-2).

Claims 10 and 15 are directed to the feature of a variable force exerted on the cutting blade substantially vertical to the interface being measured while maintaining the cutting depth constant (see the specification at page 22, lines 2-6).

Claims 11 and 16 are directed to the feature of two motors, one to move the cutting blade in the direction parallel to the interface and the other to move the cutting blade in the direction vertical or perpendicular to the interface (i.e., in the depth direction).

Claims 12, 13, 17 and 18 are directed to the arrangement connecting the cutting blade to the motor which enables the depth of the cutting blade to be automatically controlled.

In light of the foregoing, the application is now believed to be in proper form for allowance of all claims and notice to that effect is earnestly solicited. Please charge any deficiency or credit any overpayment to Deposit Account No. 10-1250.

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